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ABSTRACT

The report describes the components of the educational program provided by the Industrial Training Centers of the Training and Career Development Organization of ARAMCO (Arabian American Oil Company) in Saudi Arabia. ARAMCO provides in-house academic or job skills training to over 15,000 employees. Characteristics of the company's training program include a flexible organization permitting rapid adjustment of curricula and close cooperation with the Saudi government. Academic training takes place in three settings: Industrial Training Centers, the College Preparatory Program Center, and the Professional English Language Center. A section on ARAMCO English language training programs covers English instruction in all three settings, faculty, staff development, curriculum and materials, student evaluation, and comparison with other English language programs. The Industrial Training Centers are described including their mathematics, science, and general education courses. The college preparatory program is also reviewed, noting mathematics and science courses, support materials, student assessment, textbooks, and comparison with U.S. high school mathematics and science programs. Remaining sections address preparation for Out-of-Kingdom study, admissions considerations, and academic support services. (DB)

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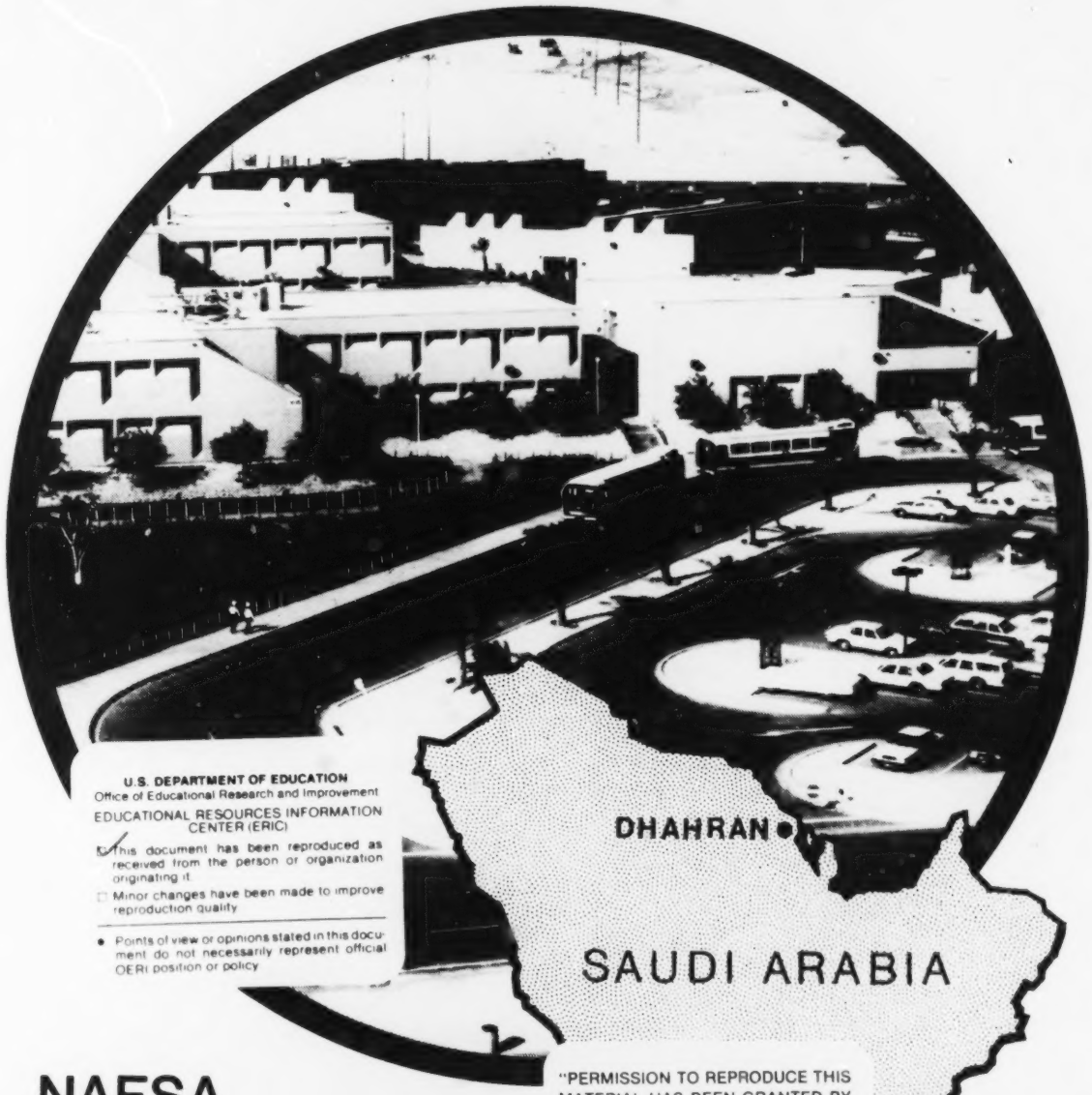
THE ARAMCO INDUSTRIAL TRAINING CENTERS:

ACADEMIC TRAINING AND COLLEGE PREPARATORY PROGRAMS



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THE ARABIAN AMERICAN OIL COMPANY (ARAMCO)

ACADEMIC TRAINING
and
COLLEGE PREPARATORY
PROGRAMS

A DESCRIPTIVE REPORT

National Association for Foreign Student Affairs
Consulting Team

May 1985

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INTRODUCTION

In February, 1985, the National Association for Foreign Student Affairs (NAFSA) entered into a contract with the ARAMCO Services Company to review, evaluate, and describe certain curriculum components of the Industrial Training Centers of the Training and Career Development Organization of ARAMCO in Saudi Arabia. Those components selected for examination included the general education courses, English language training programs, specific college preparatory curricula, the grading system, examination requirements, and program organization. The primary purpose of the evaluation was to compare the Industrial Training Centers' general education courses to U.S. high school courses and to assess the extent to which ARAMCO is adequately preparing trainees for U.S. college/university study.

The team assembled by NAFSA to carry out this project included the following members of the association: Hugh M. Jenkins, former executive vice president, serving as coordinator of the team; J. Kent Johnson, director of international services, Ohio Wesleyan University, editor; Gary W. Hopkins, associate director of admissions, University of Delaware; Robert Hannigan, dean of admissions and records, Humboldt State University; and David W. Eskey, associate professor of education, University of Southern California. To complete the team NAFSA recruited the following academic skills specialists: James H. Pickering, dean of the College of Humanities and Fine Arts, University of Houston; Thomas A. Boehm, associate, Bureau of Science Education, New York State Education Department; and Lynn A. Richbart, associate, mathematics education, New York State Education Department.

After gathering in Houston for a pre-departure briefing and orientation provided by the Saudi Career Development Department of the ARAMCO Services Company, the team members left for Dhahran on February 14 and spent the next three weeks carrying out their investigation and preparing their report. An oral report was presented to the ARAMCO administration in Dhahran prior to the team's departure on March 7. During their stay in Saudi Arabia, the team visited the training centers, attended classes, talked with some fifty members of the administration, faculty, and training staff, and interviewed a large number of students and others who were directly or indirectly involved with the training program.

The ARAMCO programs were examined from two perspectives: (1) an international perspective (including recognition of those elements considered essential for a successful program of international educational interchange, and knowledge of those persistent problems that students face when studying outside their homelands); and (2) an educational perspective (involving expert knowledge of the latest developments and standards in U.S. high school courses and of the college preparation received by U.S. students). In this dual context, it was obvious that the preparation of ARAMCO trainees for study in the United States meets a very high standard.

As this report clearly illustrates, educational training represents a massive commitment on the part of ARAMCO. Within this context the Out-of-Kingdom college program, which was the primary focus of the team's concern, assumes special significance. It provides future leadership for the Company and involves a major investment in each participant. The activities described in the report demonstrate the effort and commitment required of the students and indicate the high standard of achievement that is the goal of the program. As such, it is in many ways a model in international educational training that is worth noting by those in colleges and universities concerned with the admission and education of foreign students.

In requesting the descriptive report, ARAMCO stipulated that it should be expert and objective and provide useful guidelines for those who must make educational evaluations in determining the admission and placement of foreign students in U.S. colleges and universities. In presenting this descriptive report, the team has made every effort to meet these specifications, believing that the ARAMCO training program should be better known in the U.S. higher educational community. The National Association for Foreign Student Affairs sees its sponsorship of this project and the submission of this report as an important contribution to the strengthening of effective programs in international educational interchange.

THE DEVELOPMENT OF ARAMCO TRAINING

A Brief History: On May 29, 1933, the government of His Majesty King Abdul Aziz al-Saud of Saudi Arabia signed an historic agreement with the Standard Oil Company of California (SOCAL). This agreement, which in its original form called for a concession of sixty years, led to the founding in 1944 of the Arabian American Oil Company (ARAMCO). In 1938, following a period of extensive geophysical exploration and mapping, oil was discovered at Dammam (near Dhahran) in quantities sufficient to justify commercial development. Over the years, ARAMCO has played a key role in the economic expansion of the Kingdom of Saudi Arabia and the development of the international oil industry.

The major challenge faced by ARAMCO during the early years was one of manpower—that is, finding enough able-bodied men willing to participate in the grueling work of building the infrastructure of the new company. Trained experts were imported from abroad, but much of the work required the immediate hiring of employees with little or no education or job skills. On-the-job training was clearly the answer. In response, the ARAMCO Development Training Program was founded in 1948.

Over the years, the extent of ARAMCO's manpower needs and training activities have closely paralleled oil production, as the following figures indicate.

Year	Barrels of Oil/Day	Number of ARAMCO Employees
1945	58,000	11,000
1955	965,000	22,000
1965	2,000,000	12,000
1975	6,800,000	19,000
1980	9,631,000	48,000
1983	4,374,000	57,000

Though the current oil glut has led to retrenchment among all oil producers, including ARAMCO, there has been no diminution in the Company's basic commitment to its training programs. Even though ARAMCO has sent Saudi employees abroad to study since the 1940s, that commitment was substantially strengthened in 1977 with the inauguration of the College Degree Program (CDP)*. The CDP was designed to provide ARAMCO employees with Out-of-Kingdom (OOK) study in the United States leading to a university degree. It was followed in 1983 by the College Preparatory Program (CPP), which is described in detail elsewhere in this report.

ARAMCO Training Today. Facts and Figures: ARAMCO currently employs some 56,000 people in five major communities (including its Dhahran headquarters) and in ten other industrial sites throughout Saudi Arabia. In 1983, approximately one-third of these employees participated in some sort of academic or job-skills training. ARAMCO training is provided by a full-time staff of 1830 teachers and 1430 support personnel, who together occupy facilities totaling 154,000 square meters (more than 1.5 million square feet). The major centers alone comprise 410 classrooms and 105 shops. The fact that ARAMCO employees represent some 57 different nationalities not only adds to the complexity of the training needs, but also reinforces the central role of English in both the training and day-to-day operations of the company. English is, and is likely to remain for some time, the working language of the Saudi oil industry.

In addition to this massive in-house training program—certainly one of the largest in the world—1380 Saudi employees participated in 1983 in the College Degree Program (520 in Saudi universities and 860 abroad); 20 employees were enrolled in the Advanced Degree Program**; and 770 Saudi employees, all university graduates, were enrolled in the three-year Professional Development Program, which includes a variety of ARAMCO job assignments and practical training.

*ARAMCO management needs are similar to those of all leading oil companies, who hire outstanding graduates from leading engineering and scientific programs throughout the country. Saudi students selected to participate in the CDP have the potential to be this type of student.

**Graduate level study in the United States.

Trends: Several early characteristics of ARAMCO training remain as hallmarks today: (1) provision of the best training possible; (2) a flexible organization which permits rapid adjustment of curricula to meet changing needs; and (3) close cooperation with the Saudi government.

While specific training objectives are included throughout this report, the following general objective has continued to serve ARAMCO over the years:

> They (ARAMCO training programs) aspire after meeting the urgent needs of the Kingdom through the provision of all the possible chances that could help in developing a skilled Saudi Arab work force that is able to perform efficiently at all levels and in all positions.

ARAMCO's present system of testing, evaluation, and job placement stands in stark contrast to the early lack of screening and 70% turnover rate. Today, the progress of each ARAMCO employee is monitored through a comprehensive placement and tracking system called the Saudi Industrial Training and Career Development Tracking System.

Between 1970 and 1980, 35,000 new employees were hired, including 15,000 as full-time trainees. They all required English training to prepare for either further training or direct job placement. Before the 1970s, most new employees spoke no English and had completed only six years of elementary education.

The number of new-hire high school graduates who have already studied English for six years has increased dramatically in recent years. This, in turn, has required more sophisticated training and better-qualified teachers. New Saudi employees are also promoted in less time because of their higher entry-level qualifications.

The willingness of the early student employees to undertake additional training—and, indeed, to fit the training into a complicated work shift system—indicates the determination which has elevated these individuals to leadership positions within ARAMCO today. The prime example of both the dedication of the early ARAMCO employees and the validity of ARAMCO training is Ali Naimi, ARAMCO President, who was hired as a young man in the 1940s and educated in an ARAMCO Industrial Training Center (ITC).

Finally, it should be noted that ARAMCO's role in the development of Saudi resources is not limited to the discovery and production of oil. The first ARAMCO-built Saudi government school was completed in 1954. To date, ARAMCO has built 62 elementary, intermediate and secondary schools, which were initially constructed for use by ARAMCO employee dependents.

Drawing upon the administrative and technical expertise of ARAMCO, the Saudi government has charged ARAMCO with developing a natural gas gathering and utilization plan. Electric power and sweet (fresh) water projects have also been established as a result of ARAMCO's wide-ranging expertise.

Current Organization: ARAMCO training activities are divided into three broad areas: academic training, job skills training, and college/university preparatory training.

Academic training—the main focus of this report—takes place in three settings: Industrial Training Centers (ITCs), the College Preparatory Program (CPP) Center, and the Professional English Language Center (PELC).

Job skills training takes place both in Job Skills Training Centers (JSTCs) and through On-the-Job Training (OJT) at the various ARAMCO industrial sites. OJT responsibility is shared by both training operations and the various line organizations.

College/university training occurs both in-Kingdom and out-of-Kingdom. ARAMCO sponsored 860 (10%) of the 8630 Saudi students studying in the United States in 1984. An additional 520 ARAMCO employees are studying at Saudi Arabian universities.

In Fall 1984:

- 652 ITC teachers taught 15,053 employees in 51,578 training class periods (TCPs) at 13 main and 12 satellite locations. An additional 40 teachers were either on loan to the curriculum or testing units or on vacation during the same period.

- The year-old College Preparatory Program tripled its enrollment to 158 students (up from 54 in 1983) attending 1260 class periods with 29 CPP teachers.
- 295 JSTC instructors taught 3901 employees in 13,702 training class periods at one satellite and six main locations.

The above figures do not include approximately 900 on-job trainers.

ARAMCO ENGLISH LANGUAGE TRAINING PROGRAMS

ARAMCO offers its employees three distinct academically oriented English language training programs. The Industrial Training Center (ITC) English program is offered at 13 ITC sites located throughout the Kingdom, mostly in the Eastern Province (see map in ITC section of this report). The College Preparatory Program (CPP) and the Professional English Language Program (PELP) are offered at adjacent sites at the Dhahran headquarters of ARAMCO.

English language training is also offered to employees receiving job training at ARAMCO's Job Skills Training Centers (JSTCs) and at several on-the-job training sites associated with major ARAMCO facilities. Each program is targeted to a particular group of ARAMCO employees, though certain employees in the course of their careers may receive training in two or more of these programs, depending on their abilities and on the specific manpower needs and requirements of ARAMCO.

Each of the academic English language training programs is designed to meet three specific needs:

1. the actual on-the-job English needs of ARAMCO employees;
2. the individual needs of employees—for example, the satisfaction and prestige which come with having learned a foreign language; and
3. the language needs of students planning to pursue college degrees at U.S. universities.

Industrial Training Center (ITC) English Language Program

The ITC English language program consists of seven distinct levels. The Basic English Program (BEP*) comprises Levels 1-4. More advanced courses are offered at Levels 5-7. Each level consists of 360 hours of instruction. The emphasis at each level is on basic language skills instruction (listening, speaking, reading, and writing) rather than on the acquisition of a body of knowledge.

Students who complete ITC Level 7 and achieve a minimum TOEFL score (currently 500) may qualify for out-of-kingdom study in university degree programs in the United States. Some may also qualify for an abbreviated version of the College Preparatory Program (CPP), which is usually reserved for "fast track" Saudi secondary school graduates, that is, those who have completed the Saudi government secondary school science stream with an overall average of 80% or better.

College Preparatory Program (CPP) English Component

The CPP's English component, like the program as a whole, is designed to facilitate the student's admission to a university and to improve his chances for academic success once his university education has begun.

Since a mastery of English is essential to success in virtually any American university, the English component of the CPP is a particularly crucial one. Of the total of 1440 hours required in the regular six phases of the CPP (see Figure 6), 970 are in the area of English language skills. One hundred two (102) additional hours are required in study skills and TOEFL and SAT preparation. Students who achieve less than the 500 TOEFL target score by the end of Phase 6, but score between 460 and 499, may attempt to improve their score by participating in Review Phases 7 and 8. Of the 480 hours of instruction required by these two levels, 285 are in the area of English. The goals of the CPP have been stated as follows:

Upon completion of the full course sequence, trainees should be able to:

1. achieve a TOEFL score of 500 or better;
2. perform effectively all required language functions related to everyday life in an English-speaking environment;
3. perform language-related tasks required for successful study, and to understand lectures, take notes, read texts and participate in class discussions in universities where English is the medium of instruction.

*The BEP is replacing the older Regular English 1-4, VELT (Vocational English Language Training), and Intercom programs.

It seems clear from a study of the ARAMCO "Descriptive/Objectives" statements and the textbooks employed in each phase of the program that the CPP has been carefully designed to achieve the first goal above. It is also clear from our classroom visitations that the steps required to achieve this goal are being implemented and that the quality of the instruction is uniformly high. The instructors are well-trained, well-prepared, and dedicated; the students are alert, articulate, and willing to participate. In short, there is little to suggest that the curricular design of the CPP is in any way incommensurate with its stated goal of enabling students to achieve the TOEFL score needed for admission to many American universities. It also seems clear that mastery of the study skills component can increase the ARAMCO student's chance for academic success in a U.S. university.

Professional English Language Program (PELP)

The Professional English Language Program is a special English program for (1) those who have attended Saudi and other Middle Eastern universities (where English is not the language of instruction) and need to upgrade their English language proficiency for their current jobs and for job advancement; and (2) long-term ARAMCO employees, without college degrees, who speak English fairly well but who have deficiencies in reading and writing. Placement in PELP and advancement through the program, which normally takes a year to complete, is based on demonstrated language performance in written and oral communication, including the reading of texts of a business nature.

Faculty

ARAMCO employs a faculty of more than 500 English instructors. Of these, between 20 and 25 percent are native speakers (mainly British and American). The remainder come mostly from other Middle Eastern countries. All are experienced teachers of English as a second language (a minimum of 4 years is required, but many have been teaching for 10 years or more), and many hold a master's degree in an appropriate field. ARAMCO supports and encourages those without an advanced TESOL degree to pursue a master's degree in TESOL offered in Dhahran by Florida State University.

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Staff Development

The Company also maintains a staff development unit for the orientation of new faculty; orientation to new programs, methods, and materials for all faculty; and general in-service faculty development (micro-teaching workshops, introduction to computer-assisted instruction (CAI), etc.). As faculty members contribute years of service to ARAMCO, they also qualify for the "Refresher Program," in which the Company supports their attending appropriate Out-of-Kingdom courses to "upgrade their skills and keep them current in their instructional field."

Curriculum and Materials

Curricula are developed and materials either chosen or developed by the Academic Curriculum Unit working in conjunction with the various programs of instruction. This unit is also responsible for the content of course examinations at all levels. Commercial materials currently in use are among the best available, and, at the advanced levels, are similar to those used in the best American pre-university ESL programs.

Student Evaluation

All students are tested regularly. For each level, there are mid-term and final examinations, which must be passed for advancement to the next level. In the CPP, students must take an institutional TOEFL at the end of each phase. To be eligible for Out-of-Kingdom university training, a student must earn a score of 500 or better on the international TOEFL.

Comparison with the Consortium of Intensive English Programs

In each of the categories listed above (faculty, staff development, curriculum and materials, and evaluation), ARAMCO's English programs maintain standards similar to those of the member programs in NAFSA/ATESL's* Consortium of Intensive English Programs (CIEP). It must be kept in mind that the ITC English language program is offered in a Saudi Arabian setting to classes made up of Saudi students only.

Comparison with U.S. High School English Programs

It is difficult to compare ARAMCO's CPP and ITC English programs with American high school English programs. While the general academic focus of such programs (listening, speaking, reading, and writing) may be similar, the relative emphasis given to these language skills is very different. A stated goal of ARAMCO's programs is to improve the student's English language proficiency in order to meet the TOEFL score required for study abroad (Aramco requires a 500 minimum). As a result, these programs have tended to emphasize vocabulary, grammar, and basic reading comprehension at the expense of both writing and more extensive reading. However, current plans are to modify the curriculum to include the sustained reading and writing requirements found in U.S. high school grades 10 to 12.

ARAMCO's programs are designed to develop basic skills. However, plans call for the development of the kinds of analytical skills stressed in (at least the better) American high school programs for college-bound students. In courses requiring a good deal of rote learning and/or formulaic problem solving, ARAMCO students should be able to compete with their American peers. But in courses requiring a great deal of reading, individual acquisition and analysis of information, and organization of this new information into oral or written presentations, these students may experience some difficulty, at least initially.

*National Association for Foreign Student Affairs/Association of Teachers of English as a Second Language

INDUSTRIAL TRAINING CENTERS (ITCs)

ARAMCO offers a wide array of training programs at 13 Industrial Training Center (ITC) sites and 12 satellite locations throughout the Kingdom. The centers are coordinated under three training departments: northern, central and southern. Northern Area Training Department sites are located in Abu Ali, Berri, Ju'aymah, Rahima, Ras Tanura, and Safaniya. The Central Area Training Department coordinates sites in Dammam and Dhahran, including the College Preparatory Program (CPP), Professional English Language Program (PELP), and the ARAMCO Program Development and Evaluation Division, all located in Dhahran. Southern Area Training Department sites are located in Abqaiq, Aindar, Al-Hasa, Khurais, Shedgum, Udhailiyah, and Uthmaniyah. Figure 1 shows the locations of the ITC and other ARAMCO training facilities.

ITC mathematics, science, and general education courses are described below. ITC mathematics and science course content provides the foundation for CPP mathematics and science course content, which is discussed in the next section of this report.

The Role of the Industrial Training Center Programs in Saudi Arabia

Training provided by ARAMCO for its employees is specifically designed to produce a Saudi manpower force capable of functioning at all levels in the Company's operations and administration. Consequently, the focus is on the particular needs of the Company. Training programs do not include instruction in such subjects as Islamic studies and Arabic language. However, in preparation for higher-level positions, both in technical and non-technical areas, training does include enrollment in universities within the Kingdom of Saudi Arabia and in other countries. Preparation for study outside the Kingdom is designed primarily to meet the requirements for admission to U.S. colleges and universities.

In 1979, there was a series of meetings between representatives of ARAMCO and of the Saudi Ministry of Education. At those meetings, certain equivalencies were established between the courses offered in the ARAMCO ITCs and those offered in the Saudi government comprehensive secondary schools. ARAMCO subjects examined included chemistry, physics, mathematics, English, social studies (geography), drafting, and commercial subjects (Arabic and English typewriting, business mathematics, and accounting). ITC English language training courses exceeded the content levels found in the Saudi government comprehensive secondary schools. In the other subjects, credit hours for the ITC courses were established. Since that time, there have been a number of additions to the ITC math and science courses to make them more comparable to government programs.

The question of course equivalencies between the ITCs and the Saudi government comprehensive secondary schools is primarily an in-Kingdom issue and is of concern only to those trainees who may wish to transfer to a Saudi government comprehensive secondary school. This is an increasingly small number of trainees since many of the recent college-bound students already have a Saudi secondary school certificate at the time of employment. The question of equivalencies does not relate to those students from the ITCs whose academic status has made them eligible for participation in the Out-of-Kingdom study program.

Mathematics Courses in the Regular ITC Math Program

Introduction

Mathematics is taught at Levels 2-7 in the ITC Program. For the most part, each year of study is comparable in length to a year of study in U.S. high schools (180 hours). Each year of study is divided into two semesters of 90 hours each. Levels M2AB, M3AB, M4AB, and BM5AB constitute the basic program, while M5AB, M6AB, ACCT.6AB, ACCT.7AB, GEOM.7AB, TRIG.7AB, and CALC.7AB form the advanced program. Students must pass one level before proceeding to the next. Final grades are calculated as follows: final examination (60%), mid-term examination (20%), and instructor's grade (20%).

After Level 2, all instruction and testing is done in English.

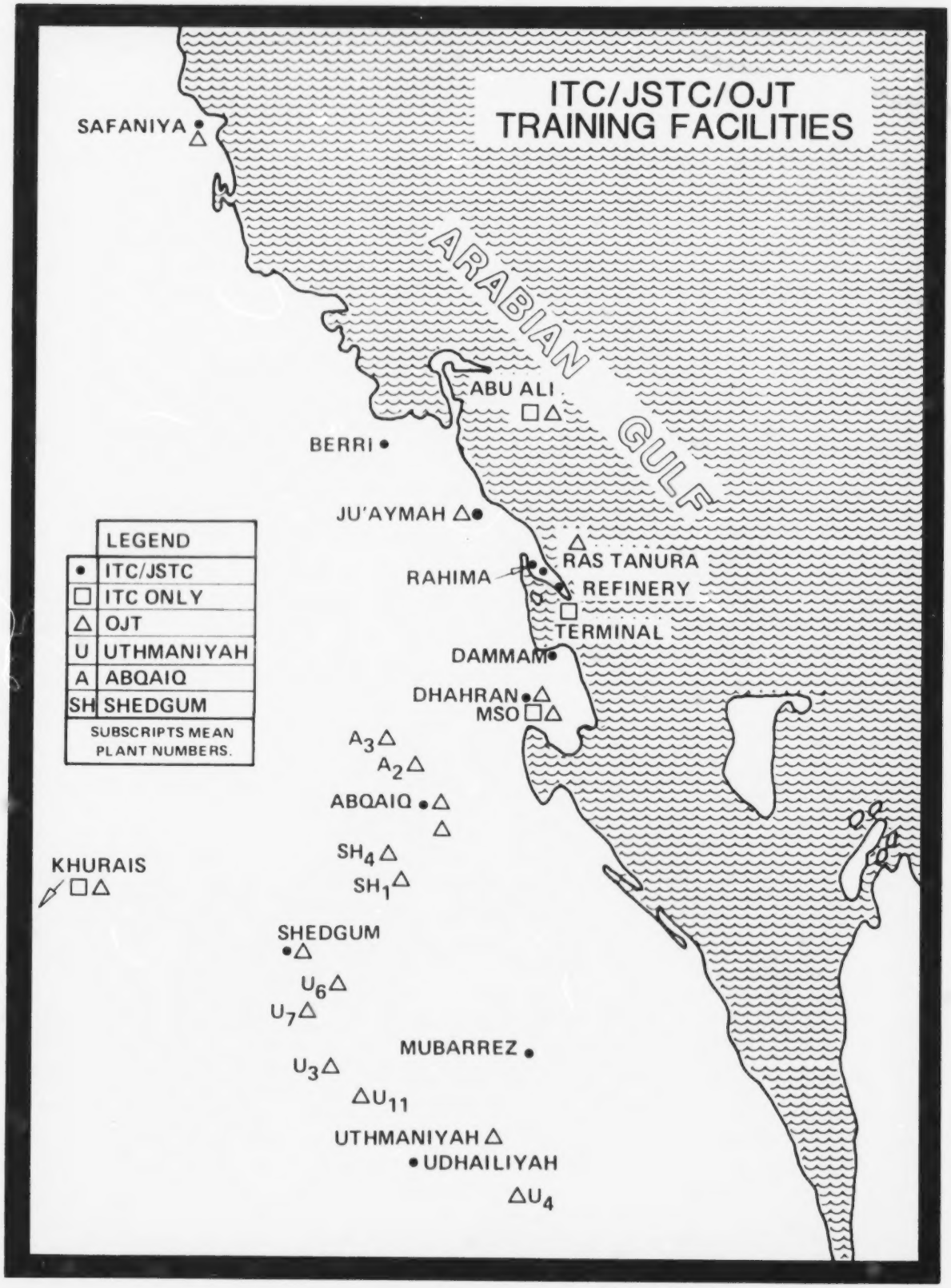


FIGURE I: ITC/JSTC/OJT TRAINING FACILITIES

Levels M2AB, M3AB, and M4AB

These courses form the common core of the ITC programs. They contain arithmetic, elementary geometry, and introductory algebra topics that are comparable to those taught in the United States before high school mathematics.

BM5AB, ACCT. 6AB, and ACCT. 7AB

These courses prepare students for non-technical, or "soft-skills," jobs. Business Mathematics (BM5AB)* includes such topics as discounts, interest, and payrolls, and is comparable to such topics taught in U.S. classes of business arithmetic, consumer mathematics or general high school mathematics.

Accounting 6AB includes such topics as double-entry bookkeeping, reconciling statements, and posting to ledgers. Accounting 6AB, unlike the mathematics courses, meets 2 hours per day for a total of 360 hours. It is comparable to a U.S. high school accounting course. Business mathematics and accounting are described in greater detail under General Education Courses.

Accounting 7AB gives the students an overall picture of the total process of business systems. It includes such topics as handling complex adjustments; specialized problems in journalizing; analysis of financial statements; and interpretation of computer-generated accounting reports.

Levels M5AB, M6AB, GEOM. 7AB, TRIG. 7AB and CALC. 7AB

These courses form the advanced level for technical job and university candidates. Course M5AB includes the algebraic topics of factorable quadratic equations, systems of linear equations, and graphing of linear inequalities. The course is comparable to an elementary algebra I course taught in U.S. high schools.

Mathematics M6AB extends the algebraic topics from M5AB and includes work with complex polynomials, conic sections, variations, and exponential, logarithmic, and trigonometric functions. The course is comparable to an intermediate algebra or algebra II course taught in U.S. high schools.

Geometry 7AB includes Euclidean and coordinate proofs with plane figures, loci, constructions, and formulas for finding areas of special polygons and volumes of special prisms and pyramids. The course is comparable to a U.S. high school geometry course. Although it is numbered 7AB, it may be taken by ITC students any time after M5AB.

Trigonometry 7AB includes work with circular and trigonometric functions, identities, vectors, complex numbers, matrices, infinite series and polar coordinates. The topics covered in this course are difficult to compare to those in U.S. programs. While some U.S. high schools may indeed teach these topics in a full-year trigonometry course, others may include these topics in courses such as algebra II and trigonometry, advanced algebra, mathematical analysis, foundations of mathematics, or pre-calculus mathematics.

Calculus 7AB includes the topics of power functions, limits, derivatives and integrals. The course is comparable to an introductory calculus course offered in U.S. high schools.

Summary

The Industrial Training Center (ITC) mathematics program is comparable to traditional U.S. high school mathematics offerings. Levels 2-4 constitute the basic program and are comparable to pre-algebra courses in the United States (see Figures II-IV). Levels 5-7 form the advanced program and are comparable to algebra, geometry, trigonometry and introduction-to-calculus courses in the United States (see Figures II-IV). Students completing the entire mathematics program with a high average should be prepared to pursue university-level calculus in the United States.

* Sometimes listed as CM5AB (Commercial Mathematics), BM and CM are the same course.

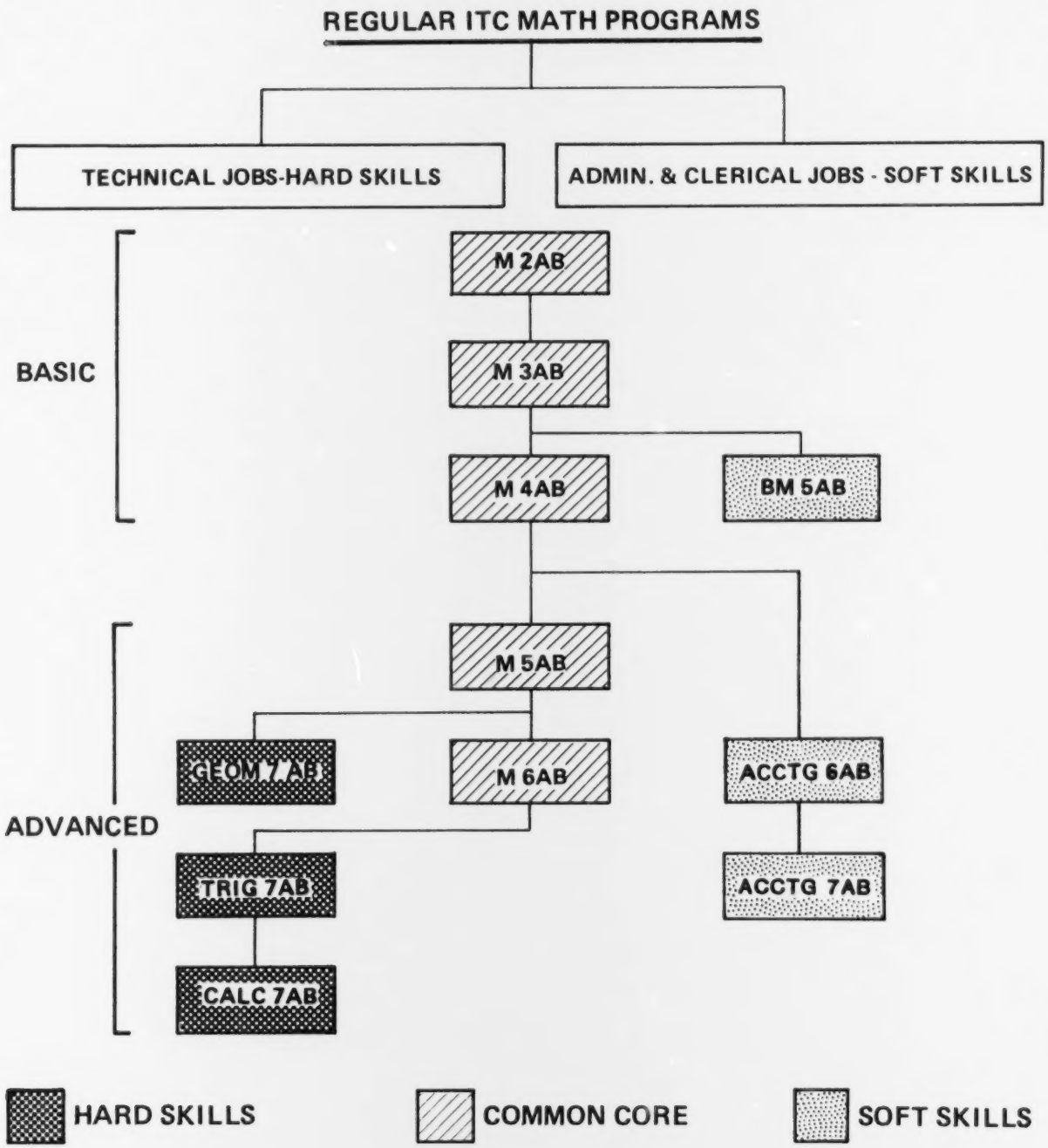
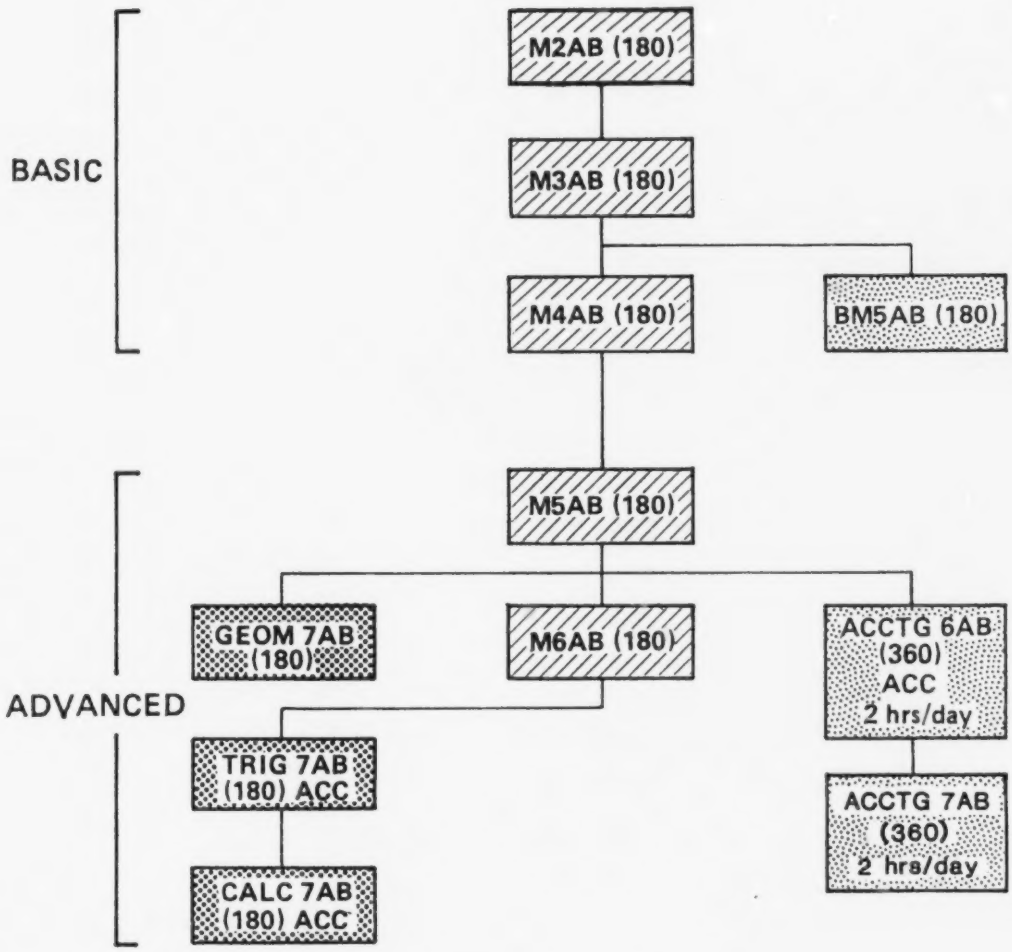


FIGURE II: REGULAR ITC MATH PROGRAMS

REGULAR ITC MATH PROGRAMS
(TIME IN HOURS)



TECHNICAL HARD SKILLS		ADMIN. & CLERICAL
BASIC	540 HRS.	720 HRS.
ADVANCED	900 HRS.	720 HRS.
TOTAL	1440 HRS.	1440 HRS.

FIGURE III: REGULAR ITC MATH PROGRAMS/TIME

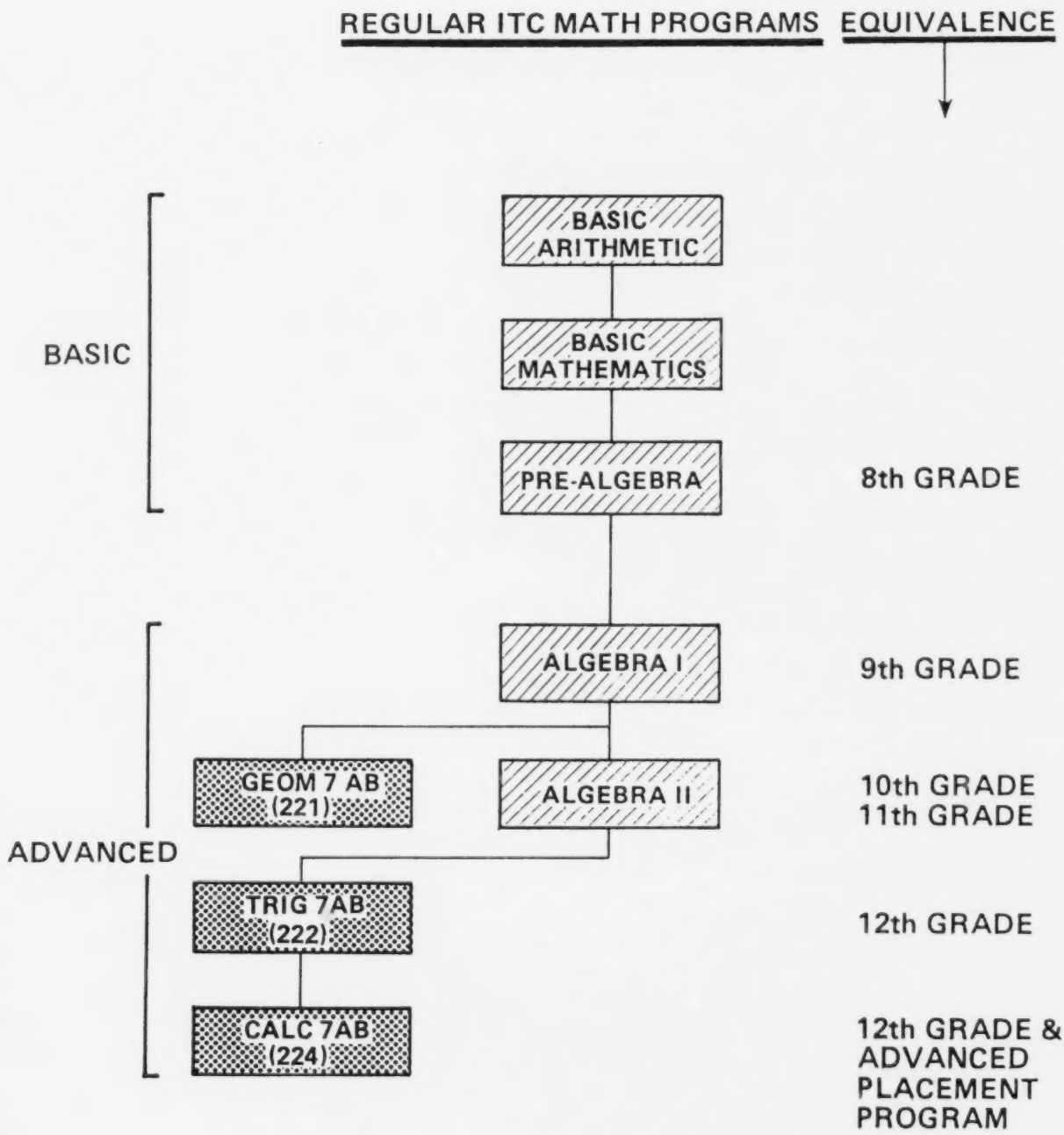


FIGURE IV: REGULAR ITC MATH PROGRAMS/EQUIVALENCE

Science Courses in the Regular ITC Science Program

The ITC science program consists of Levels 4AB through 7AB. Level 4AB is an introductory course with 360 hours of instruction that includes the development of basic concepts in chemistry and physics. Level 5AB is an introductory physics course with 180 hours of instruction, taken by non-technical majors. Level 6AB includes 180 hours of instruction in chemistry and 180 hours of instruction in physics. Both the physics and chemistry courses at this level reinforce and extend the science concepts introduced in Level 4AB. Levels 7AB physics and 7AB chemistry each have 360 hours of instruction which further develop the physical concepts included in Levels 4AB and 6AB. (Figure V provides a schematic overview of the regular ITC science program.)

Science – Level 4AB

Level 4A science presents a comprehensive introduction to the chemistry of matter. Included in this course are library investigations to help build vocabulary, films that show characteristics of the particle model for matter, field investigations that enable the student to relate concepts to his surroundings, computer software that provides alternative explanations, and student-centered laboratory activities that introduce students to some of the laboratory equipment used in the study of chemistry.

The Level 4B science course introduces students to physics, including basic mechanics and forms of energy, and ends with a technological application of some of these topics to electronic communications systems. Like Level 4A, Level 4B contains a good balance of student activities, films, computer software and field investigations.

The topics in Levels 4A and 4B would be taught at the upper range of the intermediate level (grades 8 and 9) in the United States. Courses 4A and 4B contain a more in-depth introduction to chemistry and physics than normally occurs in most U.S. schools, but they do not include any introductory material in earth science (i.e., geology, astronomy, meteorology, geophysics) or biology (i.e., plant and animal studies, ecology).

The activity-centered nature of Science 4A and 4B is a very positive characteristic. These courses introduce students to the proper use of science hardware at the beginning of their sequential science courses. The amount of laboratory activity occurring in U.S. intermediate schools varies considerably but is regarded by U.S. educators as extremely important at this level.

Chemistry – Level 6AB

Level 6A chemistry provides an effective continuation of the basic chemistry presented in Level 4A and includes a more in-depth study of the periodic table and chemical reactions. Level 6B chemistry further extends the student's perspective of chemistry to the atmosphere, water, the home, metallurgy, fossil fuels, rubber and plastics, and natural and synthetic fibers. Both Levels A and B appear to contain a good balance of student investigations, demonstrations, films, and computer software, with Level 6B introducing students to more sophisticated investigations (i.e., qualitative chemistry).

Physics – Level 6AB

Level 6AB physics reinforces the science concepts introduced in physics 4B and then presents some of these topics in more depth. In Level 6 there is an increased emphasis on applying physics concepts to problem solving. Many of the problem-solving situations introduce formulas and mathematical calculations as a means of gaining a better understanding of the topic.

Chemistry 6AB and physics 6AB cover the same topics as a one-year U.S. high school (grade 10, 11, or 12) physical science course. The ITC courses do, however, present these topics in more depth and require a higher degree of problem solving. Also, a one-year physical science course taken in the United States would require 180 hours of instruction, whereas the ITC Level 6 science courses require 360 hours of instruction.

Chemistry – Level 7AB

Level 7AB chemistry is a comprehensive course that requires students to understand the major concepts in chemistry and apply these concepts to laboratory investigations including problem solving. This course closely parallels an eleventh- or twelfth-grade chemistry course taken in the United States, with the exception of topics such as entropy and biochemistry, which are not covered in Chemistry 7AB.

Physics – Level 7AB

The Level 7AB physics program reviews and builds on the major concepts developed in Physics 6AB. The emphasis in this course is on the topics of mechanics, heat, optics, electricity, and magnetism. Problem solving and appropriate laboratory experiences are included. The ITC Level 7 physics program is quite similar to eleventh- or twelfth-grade physics courses in the United States with the exception of topics such as nuclear physics and electromagnetic radiation, which are not covered in Physics 7AB. However, these topics are covered in Level 6AB physics, which is a prerequisite for Physics 7AB.

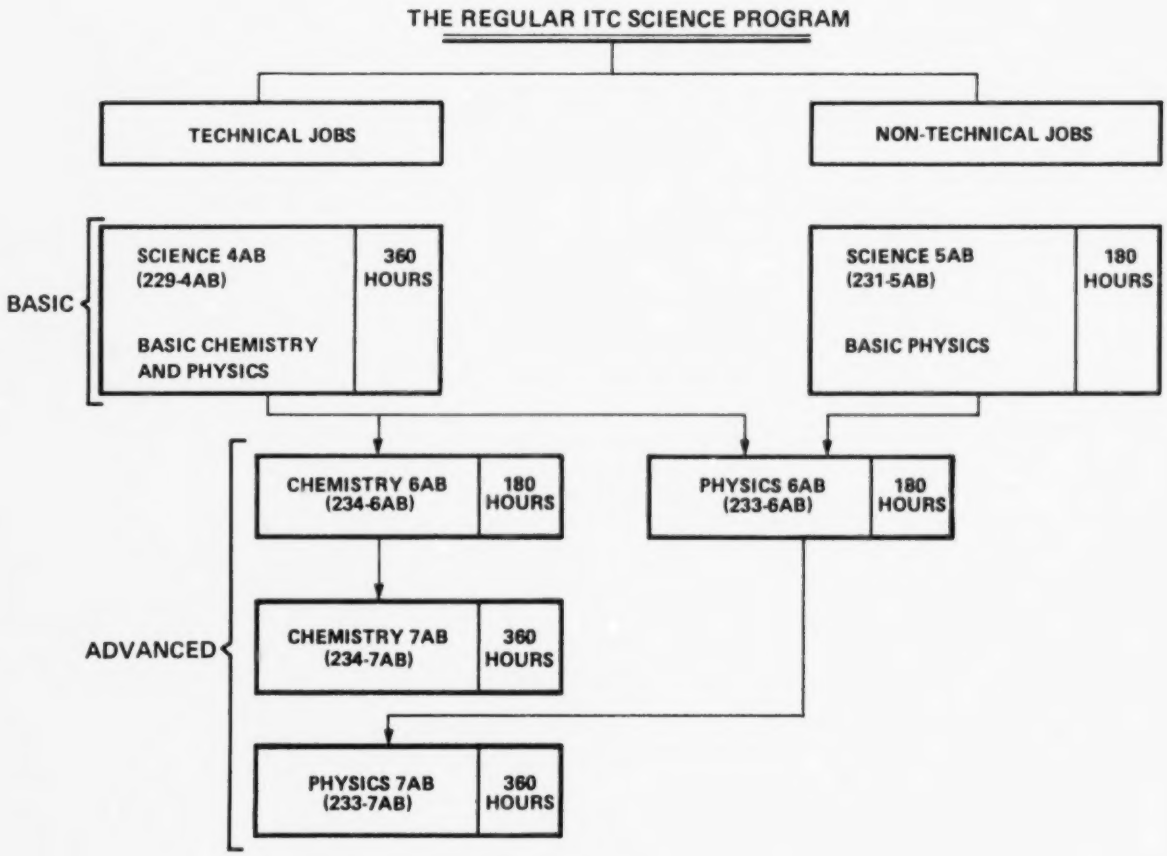


FIGURE V: THE REGULAR ITC SCIENCE PROGRAM

General Education Courses

ITC students must complete courses in world geography, accounting, business mathematics, Arabic typing, English typing, and office practice. These general education courses not only add breadth for students who will eventually study abroad, but also provide job skills for those ITC graduates who do not qualify for further study at the university level. The ITC general education courses are described below.

World Geography 5AB

Course Content: World Geography 5AB course objectives are listed as follows: "Upon completion of this level, trainees should be able to:

1. describe and evaluate the economic significance of the physical, biological, and mineral resources of the political-physical regions of the Western and Eastern hemispheres;
2. compare the agricultural and industrial production, the economic development, and some of the cultural traditions of these regions; and,
3. describe the major patterns of world trade."

Course Duration: Students normally attend World Geography 5AB one hour per day for two semesters. However, an accelerated course is available which meets two hours per day for one semester. In either case, total class hours are 180.

Prerequisites: In order to be assigned to World Geography 5AB, students must have a cumulative average of 86%. All students must have completed English 5B or be concurrently enrolled in English 5AB.

Instructional Materials: Textbooks used are *World Geography Today* by Saul, Johnson and Wood, published by Holt, Rinehart and Winston, and the companion *Students Workbook on World Geography Today. The Oxford School Atlas,* published by Hammond/Oxford University Press, and maps by A. J. Nystrom and Company are also used.

Accounting 6AB

Course Content: Students learn to set up an initial balance sheet, journalize double-entry transactions, post journal entries into the appropriate ledger, make simple adjustments, prepare six- and eight-column work sheets, close ledgers, prepare profit and loss statements, and reconcile bank statements.

Course Duration: Students attend Accounting 6AB two hours per day for two semesters, for a total of 360 class hours.

Prerequisites: Students must have completed Math 5AB with an average of 75%, Business Math 5AB, and be concurrently enrolled in English 6AB.

Instructional Materials: Textbooks used are *Century 21 Accounting* by Swanson, Boynton, Ross and Hanson, published by South-Western Publishing Company, and the companion *Century 21 Accounting Workbook.*

Accounting 7AB

Course Content: Students are exposed to the total process of business systems, including interpreting computer-generated accounting reports, analyzing financial statements of large corporations, and solving specialized technical problems in journalizing and complex adjustments.

Prerequisites: Students must have completed Accounting 6AB with an average of 75% and be concurrently enrolled in English 7AB.

Course Duration and Text: Students attend Accounting 7AB two hours per day for two semesters for a total of 360 class hours and use *Century 21 Accounting–Advanced Course* by Carson et. al., published by South-Western Publishing Company, and the companion workbook.

Business Mathematics

Course Content: Previously referred to as Commercial Mathematics (CM), Business Mathematics (BM5AB) "introduces students to the world of business and. . .the world of work."

Subjects covered include payroll preparation; simple and compound interest; discounts; payroll deductions and payroll preparation; balance sheets and income statements; stock and bond quotations, dividends, and interest.

Course Duration: Students normally attend Business Mathematics 5AB for one hour per day for two semesters. However, an accelerated course is available which meets for two hours per day for one semester. In both cases, total class hours are 180.

Prerequisites: Students who take the regular course must have completed Math 3AB with an average of 75%. To take the accelerated course, students must have completed Math 3AB with an average of 86% and English 5B or its equivalent. Both groups must also be concurrently enrolled in the appropriate level of English language training.

Instructional Materials: Textbooks used are *Business Mathematics* by Rosenberg, Lewis and Poe, published by McGraw Hill, and the companion *Workbook for Business Mathematics*.

English Typing 3AB

Course Content: Upon completion of the first year of English typing, students will be able to type a minimum of 25 correct words per minute, use all the operative functions of the typewriter correctly, demonstrate correct work habits, and type memoranda, business letters, and simple tabulated reports.

Course Duration: Students attend English Typing 3AB one hour per day for two semesters, for a total of 180 class hours.

Prerequisites: Students must have completed English 3B or be concurrently enrolled in English 3AB.

Instructional Materials: The text for English Typing 3AB is *21st Century Typewriting* by Lessenberry *et. al.*, published by South-Western Publishing Company.

English Typing 4AB

Course Content: Upon completion of the second year of English typing, students will have attained a minimum of 35 correct words per minute and will have learned to type business letters and memoranda in the approved ARAMCO format as well as standard purchase orders, invoices, bills of lading, and complex tabulated reports.

Course Duration: Students attend English Typing 4AB one hour per day for two semesters, for a total of 180 class hours.

Prerequisites: Students must have completed English 4B or its equivalent and English Typing 3B or its equivalent as evidenced by a placement test.

Instructional Materials: The text for English Typing 4AB is the same as for English Typing 3AB above.

Arabic Typing 3AB and 4AB

The course content, objectives, and duration are identical to those for English Typing 3AB and 4AB above.

Business Skills 4AB*

Course Content: Although the ARAMCO catalog lists 20 specific performance objectives for the Business Skills Program, the major objective is "to develop the competencies trainees need to be employed in a wide range of entry-level office jobs." Toward this end, students are exposed to a wide variety of practical tasks and training, e.g., proofreading, calculating, handling correspondence, receiving office visitors, answering the telephone, filing, photocopying, and handling financial tasks. Students also learn to use the simple commands of a word processor and become familiar with the basic functions and operation of data processing equipment. Maintaining the confidentiality of information, behaving in a businesslike manner, and office safety are also stressed.

Course Duration: Students may enroll in Business Skills 4AB for two hours per day for two semesters, for a total of 360 hours.

* Formerly known as Office Practice 5A-6B.

THE COLLEGE PREPARATORY PROGRAM

Overview

The College Preparatory Program (CPP) is a well-developed program of academic study designed to prepare selected ARAMCO employees for admission to universities both within the Kingdom of Saudi Arabia and abroad and to equip those students with the information and skills that will substantially improve their chances for academic success. CPP students come from two primary sources. The majority—the so-called "Fast Tracks"—are those who have graduated from the Saudi Government secondary school science track, which emphasizes mathematics and science courses. The remainder are graduates from regular ITC programs who have exhibited the potential for a college education. The CPP Fast Track Program was inaugurated in 1983.

The following programs of study are offered in the CPP:

1. An intensive program, consisting of 1440 hours of instruction, divided into six 30-day phases (1-6) which cover the following:

   English language skills, including computer-assisted instruction (970 hours), mathematics (144 hours), science (120 hours), typing (60 hours), computer programming (30 hours), study skills (102 hours), and Out-of-Kingdom orientation (14 hours);

2. A non-intensive program, consisting of 180 hours of instruction, designed to supplement existing ITC studies for trainees who are potential College Degree Program (CDP) candidates. It consists of preparation in the areas of study skills, TOEFL and SAT test-taking, typing, computer programming, and Out-of-Kingdom orientation;

3. Two six-week review phases (Phases 7 and 8), consisting of intensive English study designed to improve the TOEFL scores of CDP candidates who have completed CPP Phases 1-6 satisfactorily, but who require improvement in their TOEFL scores to be eligible for university admission. These review phases are also designed for ITC "Technical Track" students with an overall average of 86% and TOEFL scores between 460 and 499 as well as for CPP graduates with TOEFL scores of 500+ who are scheduled to attend universities with TOEFL admission requirements that exceed their present level of achievement. Of the 480 hours of instruction required at Levels 7 and 8, 345 are in English language skills (including computer-assisted instruction—CAI). An additional 120 hours are devoted to science and mathematics (60 hours each). The 15 hours of OOK orientation bring the total to 480 hours; and,

4. An enrichment program in science and mathematics for college-bound trainees with TOEFL scores of 500+. The curriculum here is flexible and provides more in-depth study in math, science, computer programming, study skills, composition, and writing research papers. Enrollment in this curriculum is on a part-time basis and is limited to a maximum of three 30-day phases.

The following admissions criteria determine which level of the CPP a candidate enters:

1. **Intensive Program**

   Recent Saudi government secondary school graduates with an overall average of 80% on the General Certificate of Education Scientific Stream may enter the intensive program as Fast Track students.

2. **Non-Intensive Program**

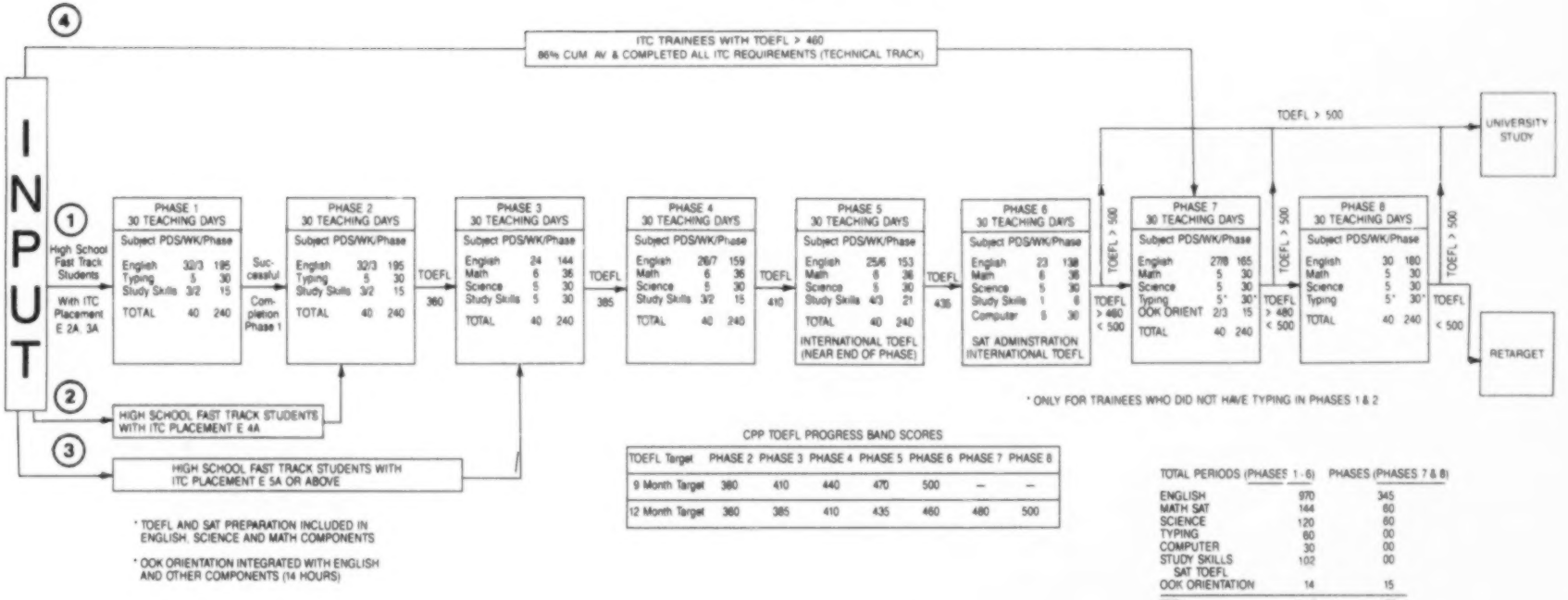
   ITC students with an overall average of 86% may enter the non-intensive program. Not all ITC students will have graduated from secondary school. They are, however, carefully prepared by ARAMCO for university study and, in the opinion of the NAFSA consultation team, are adequately prepared for university study in the United States.

3. **Review Phases 7 and 8**

   Fast Track and ITC students who have attained an overall average of 86%, but who score between 460 and 499 on the TOEFL, enter review Phases 7 and 8 in order to improve their English proficiency.

APPROVED	FEBRUARY 1985
Ali M. Diallo	
GENERAL MANAGER	TRAINING OPERATIONS

COLLEGE PREPARATORY PROGRAM
PLACEMENT AND PROGRESS CHART
(TECHNICAL & ENGINEERING STUDIES ONLY)



* ONLY FOR TRAINEES WHO DID NOT HAVE TYPING IN PHASES 1 & 2

* TOEFL AND SAT PREPARATION INCLUDED IN ENGLISH, SCIENCE AND MATH COMPONENTS

* OOK ORIENTATION INTEGRATED WITH ENGLISH AND OTHER COMPONENTS (14 HOURS)

CPP TOEFL PROGRESS BAND SCORES

TOEFL Target	PHASE 2	PHASE 3	PHASE 4	PHASE 5	PHASE 6	PHASE 7	PHASE 8
9 Month Target	360	410	440	470	500	–	–
12 Month Target	360	385	410	435	460	480	500

TOTAL PERIODS (PHASES 1 - 6)		PHASES (PHASES 7 & 8)
ENGLISH	970	345
MATH SAT	144	60
SCIENCE	120	60
TYPING	60	00
COMPUTER	30	00
STUDY SKILLS SAT TOEFL	102	00
OOK ORIENTATION	14	15
TOTAL	1440	480

FIGURE VI: COLLEGE PREPARATORY PROGRAM PLACEMENT AND PROGRESS CHART (TECHNICAL & ENGINEERING STUDIES ONLY)

4. **Math/Science Enrichment Program**

Students who attain an acceptable overall average (currently 70% for CPP students and 86% for ITC students) and who score 500 or better on the TOEFL are eligible for placement in the United States. However, because of the time lag between eligibility for U.S. placement and actual acceptance, there is generally time for these students to receive enrichment in mathematics and science prior to departure for the United States. This enrichment program is limited to part-time enrollment for a maximum of three phases of 30 days each.

The CPP Placement and Progress Chart, which summarizes the CPP Program content along with admissions and progress standards, appears as Figure VI on the facing page.

A further and more elaborated discussion of the major subject matter components of the CPP—mathematics and science*—follows below.

Mathematics Courses in the College Preparatory Program

Introduction

Mathematics is taught in Phases 3-8 of the CPP. Most students entering the CPP before Level 7 are Saudi government secondary school science stream graduates.

Phases 3-8 of the CPP include 30 hours each of mathematics instruction in English (see Figure VII). The program is designed to introduce the students to the English vocabulary, methodologies, and textbooks used for the mathematical content that they have already encountered.

Final examinations for each phase are administered and, along with two progress tests and teacher evaluations, form the basis for the promotion of students. Students must complete at least Math Phase 6 and score 500 on an international TOEFL in order to qualify for Out-of-Kingdom study.

In addition to the mathematics phases in CPP, students receive 40 hours of Scholastic Aptitude Test (SAT) preparation.

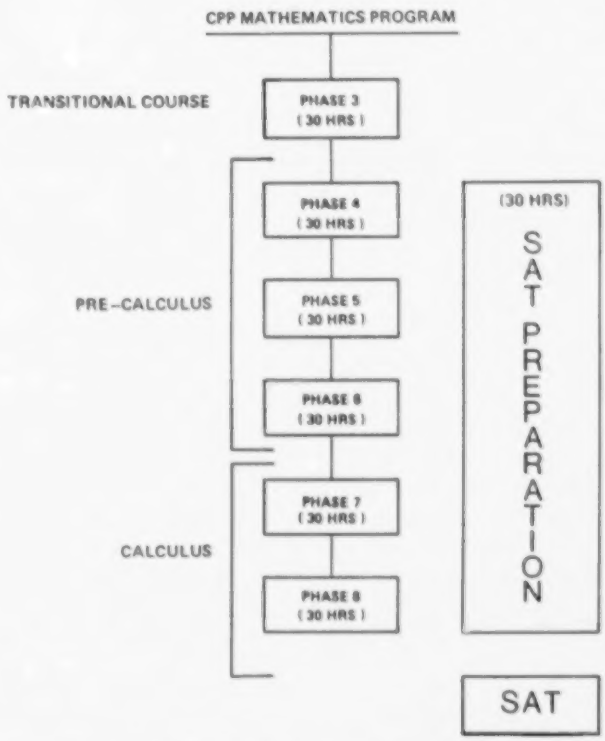


FIGURE VII: CPP MATHEMATICS PROGRAM

* English language training is described at the beginning of this report.

Phase 3

Mathematics is introduced for the first time at Phase 3 of the CPP. This course is referred to as a transitional one and includes topics from arithmetic and consumer mathematics to algebra I. For the most part, this is the first time that these students have been taught mathematics in English.

Phases 4-6

English continues to be the language of instruction for these three phases. Selected topics from algebra II, trigonometry, and pre-calculus are reviewed. Time does not permit a complete re-teaching of all mathematical topics, but major topics normally covered during the last two years in U.S. high schools are addressed. Students completing this phase with sufficient English language proficiency are permitted to go directly to the university without continuing to Phases 7 and 8.

Phases 7-8

These phases of the mathematics component of the CPP introduce the students to freshman calculus in English. Collegiate texts are used, and major topics are selected for review. Students with sufficient English language proficiency may leave the CPP for the university at the end of Phase 7 or Phase 8.

Enrichment

This flexible mathematics course provides a continuation of calculus topics presented in Phases 7 and 8. The program is based on individual needs and provides further instruction on calculus topics in English.

Summary

The mathematics component of the College Preparatory Program is designed to present a review in English of mathematical topics already encountered by students. For those coming from the Saudi government schools, this is the first time that they have been taught mathematics in English.

Mathematics, from arithmetic to algebra I, is first introduced at Phase 3. Phases 4-6 include a review of major topics from pre-calculus and, if combined with English language proficiency, may lead directly to university admission. Those students continuing to Phases 7-8 and the enrichment course review topics from freshman calculus in English.

Scholastic Aptitude Test (SAT) preparation is also included in the CPP.

Students completing the CPP are either Saudi government secondary school science stream graduates or students who have completed the ITC program, described previously. Both groups should be prepared to pursue university-level calculus in the United States.

Science Courses in the College Preparatory Program

Phases and Content

The CPP science program consists of Phases 3-8 (see Figure VIII). Phase 3 serves as an introduction to learning science content in English rather than in Arabic. The content for Phase 3 is a review of topics in secondary school general physical science.

The transition to learning science in English (rather than in Arabic) continues in Phase 4. The content of Phase 4, also a review, includes the major topics from high school chemistry and physics.

Phase 5 introduces the student to intensive college-level study in chemistry. This phase is designed to reinforce and extend the high-school-level chemistry concepts learned in Phases 3 and 4. Phase 6 introduces the student to intensive college-level study in physics and further reinforces and extends the physics topics introduced in Phases 3 and 4.

CPP SCIENCE PROGRAM

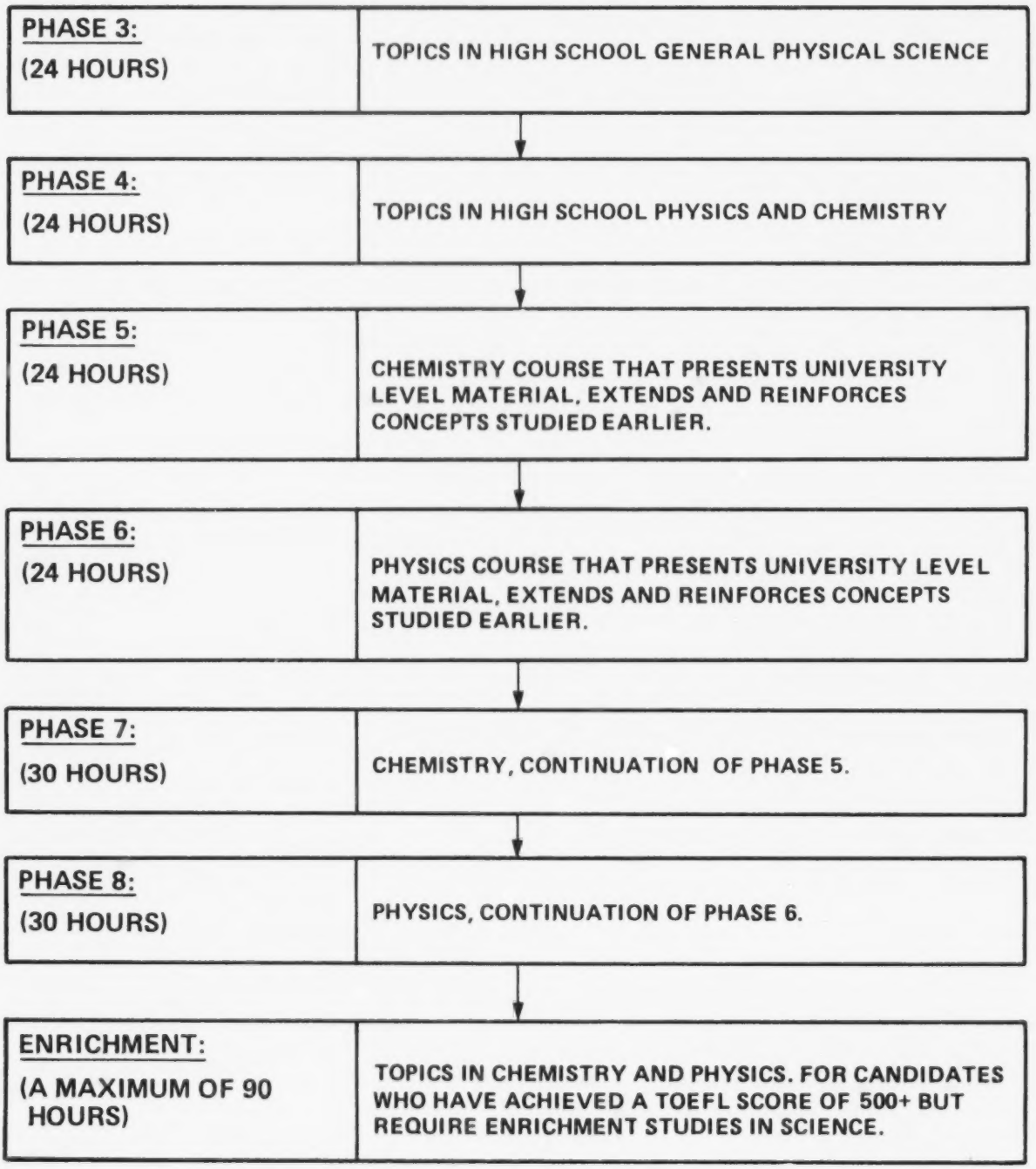

PHASE 3:
(24 HOURS)
TOPICS IN HIGH SCHOOL GENERAL PHYSICAL SCIENCE
PHASE 4:
(24 HOURS)
TOPICS IN HIGH SCHOOL PHYSICS AND CHEMISTRY
PHASE 5:
(24 HOURS)
CHEMISTRY COURSE THAT PRESENTS UNIVERSITY LEVEL MATERIAL, EXTENDS AND REINFORCES CONCEPTS STUDIED EARLIER.
PHASE 6:
(24 HOURS)
PHYSICS COURSE THAT PRESENTS UNIVERSITY LEVEL MATERIAL, EXTENDS AND REINFORCES CONCEPTS STUDIED EARLIER.
PHASE 7:
(30 HOURS)
CHEMISTRY, CONTINUATION OF PHASE 5.
PHASE 8:
(30 HOURS)
PHYSICS, CONTINUATION OF PHASE 6.
ENRICHMENT:
(A MAXIMUM OF 90 HOURS)
TOPICS IN CHEMISTRY AND PHYSICS. FOR CANDIDATES WHO HAVE ACHIEVED A TOEFL SCORE OF 500+ BUT REQUIRE ENRICHMENT STUDIES IN SCIENCE.

FIGURE VIII: CPP SCIENCE PROGRAM

After completing Phase 6, students with a TOEFL score between 460 and 500 take Phase 7 science, which is a continuation of the college-level chemistry begun in Phase 5. Students who complete Phase 7 with a TOEFL score between 480 and 500 take Phase 8 science, which is a continuation of the introductory college-level physics initiated in Phase 6. After Phase 8, some students enroll in a highly individualized enrichment program designed for students with a minimum TOEFL score of 500. The science taught as part of this enrichment program reinforces the science concepts related to a student's intended area of study.

In January 1985, four hours of instruction in laboratory work and computer-assisted instruction were added to each phase of the science program. The classrooms where CPP science courses are taught are well-equipped to carry out this laboratory work and report writing.

Laboratory experiences at this stage of the CPP student's training are extremely important. Not only does effective laboratory work reinforce and extend some of the major science concepts from Phases 3-8, but it also provides students with many of the high-level manipulative skills they will be expected to have when they start their freshman science courses.

After a student completes each phase of the CPP, he takes an examination based on the major objectives for that phase. Students must obtain a minimum score of 70% before moving on to the next phase. These examinations include both multiple choice and essay questions and frequently require a high level of problem solving in both chemistry and physics.

The courses offered in the CPP compare very favorably to science courses offered in the United States for college-bound students. Phase 4 provides a good review of the physics and chemistry that U.S. students take in their junior and/or senior years. Phases 5-8 science present content very similar to that which the Advanced Placement science students in the United States would take to earn college credit while still in high school.

Summary

The science courses in the CPP are an important step in properly preparing students for college-level science courses in the United States. Phases 3 and 4 help students learn to think about science in English. Phase 4 also serves as a review of the major concepts in high school physics and chemistry close to the time students will apply these concepts in college-level courses. Phases 5 through 8 play an important role in exposing students to college-level study before they begin their freshman science courses. The introduction of a meaningful laboratory experience in all phases of the CPP will help ARAMCO students compete more successfully in the performance phases of their science courses, especially in the many fields related to engineering.

ITC and CPP Support Materials for Mathematics and Science Teachers

Former mathematics and science teachers from ITCs are assigned to the Academic Curriculum Unit (ACU) to assist in the production of teacher support materials. Some of the materials that have been produced include behavioral objectives, pacing schedules, test outlines, and a computer-assisted instruction (CAI) software catalog.

For each course offered, there is a listing of the behavioral objectives to be covered during instruction. The objectives are written in simplified form without criterion measures or conditions. A typical objective is: "Write the equation of a circle given the coordinates of its center and the length of its radius."

The pacing schedules available for most courses indicate the amount of time that should be spent on each section of a particular text. These recommended instructional times are broken down into as little as one-half of a class period. In addition, many of the course pacing schedules include suggested exercises to be covered in class or assigned as homework. Chapters and final test dates are indicated in the schedule.

Since final examinations are kept secure and are not seen by the teachers, it is important to make instructional staff aware of the emphasis that should be placed on specific objectives. Final test outlines provide this information to the teacher. For each course, these outlines detail how many questions on each test will be devoted to a specific objective.

With the relatively recent establishment of computer-assisted laboratories and the purchase of appropriate software, it has become important to maintain an annotated list of available materials. The CAI software catalog is continually being updated for this purpose. In Part I of the catalog, each course is broken down by chapter section, and for each section, appropriate diskettes are identified by catalog number, title, program name, and lesson number.

In Part II of the catalog, each CAI program is described. The description includes the CAI program name, availability of teacher or student guides, and relevant comments such as teacher management-system capability. For each individual lesson of the CAI program, more specific information is provided, such as whether it is tutorial only, tutorial with questions, diagnostic, or simply drill and practice. Following this coded information, there is an indication of the time required to complete that lesson. Finally, there is a summary of the concepts covered in the lesson.

Part III of the catalog lists addresses of software publishers and the operating procedures for the Apple microcomputers used in the CAI laboratories.

Student Assessment

ARAMCO's Academic Curriculum Unit (ACU) provides testing support for the CPP and ITC programs. Senior advisors in the basic academic curriculum areas construct the examinations based on test blueprints which identify the number of questions per objective for each level or phase. Several alternate forms of each test are produced to strengthen security.

Examinations are prepared for mid-terms and finals for each level of the ITC and for finals for each phase of the CPP. A testing schedule is designed to ensure that each form will be secure. Final examinations for each course are administered at one single time throughout the entire ITC system.

Tests may be either completely objective or may include subjective questions, depending upon the subject and level being evaluated. Since large numbers of students are being tested and time is a factor, there is a tendency to use a multiple-choice format and machine scoring wherever feasible.

After objective tests are given, the results undergo a battery of psycho-metric analyses. Difficulty, reliability, and discrimination indices are calculated for each item. Percentages of student responses are produced for each choice on every multiple-choice item. Careful analysis ensures the comparability of different test forms.

Students' final grades for a level or phase are based on a scaled score derived from final examinations, mid-term or progress tests, and teacher evaluations. The weight assigned to each component varies slightly by subject and program.

Textbooks

Textbooks for the CPP and ITC programs are appropriate and up-to-date. Titles used in the programs are also used in various high schools and colleges in the United States.

Senior subject advisors maintain membership in appropriate professional organizations and continually review new texts. All advisors and most senior teachers also maintain a library of alternate texts for their areas of concern.

Comparison with U.S. High School Mathematics and Science Programs

One of the consulting team's charges was to evaluate ITC and CPP mathematics and science courses individually and to compare them to U.S. high school curricular standards. After reviewing program organization, course offerings, prerequisites, level of difficulty, and means of assessment, we have concluded that these courses are, for the most part, comparable to traditional U.S. courses.

The instructional materials and physical facilities are an important part of the ITC and CPP mathematics and science courses. The texts, for the most part, are well-suited to the goals of the courses in which they are used and represent accurate descriptions of the disciplines on which they are based. To complement these texts, specific course objectives, pacing schedules, test outlines, and computer-assisted instruction annotated software catalogues have been developed. The texts and these ancillary instructional materials provide a solid base for developing high-quality classroom instruction.

The physical facilities used for mathematics and science instruction are attractive and well-equipped. The science laboratories have adequate storage facilities, electric hoods, teacher demonstration desks, and large student work areas equipped with water, gas and electricity.

In addition, ARAMCO has developed a sophisticated testing service and an extensive supervisory program to support mathematics and science instruction.

We were impressed with the psychometric capabilities provided by the Academic Curriculum Unit.

Finally, we noted the extensive supervisory pattern in place. Mathematics and science subject-matter specialists provide overall supervision of the entire program. At each ITC and at the CPP, mathematics and science senior teachers observe teachers to oversee the program and assist them with classroom instruction. These observations, along with those of the principals and subject-matter specialists from the ACU, are much more extensive than those carried out in U.S. classrooms.

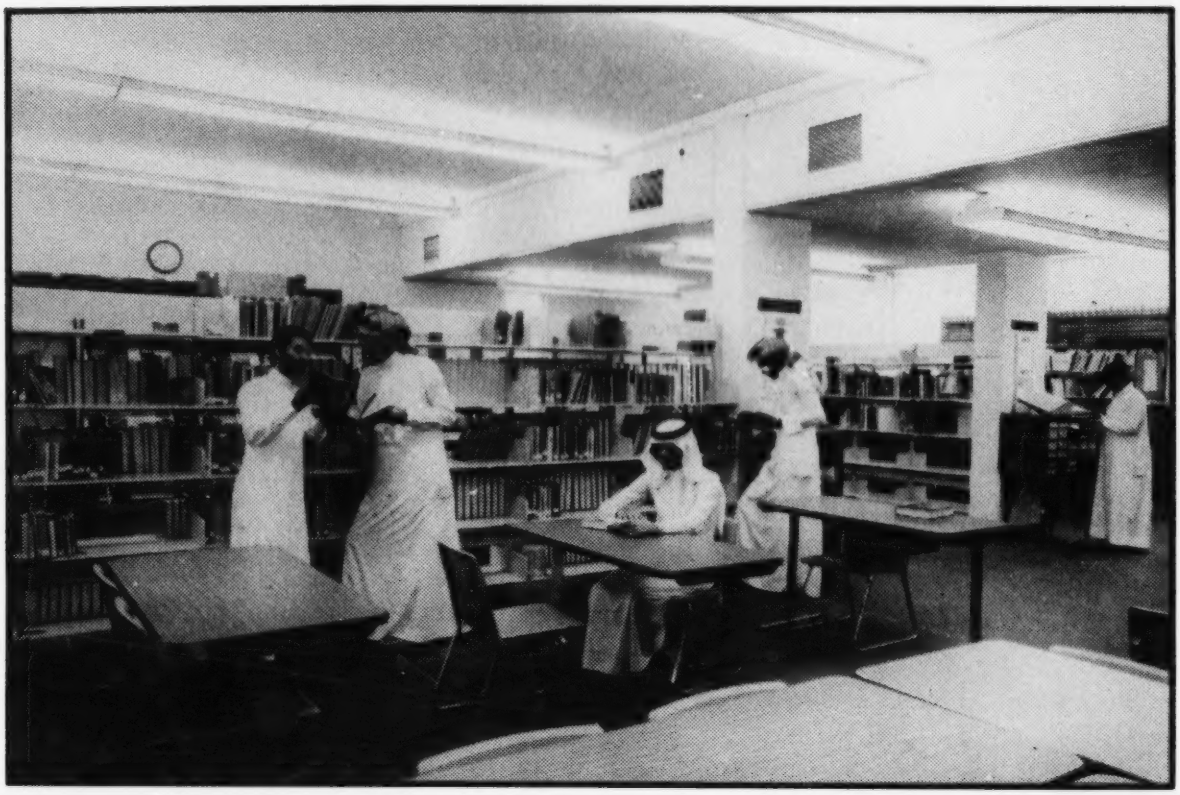
Overall, ARAMCO is to be commended for its mathematics and science programs.

PREPARATION FOR OUT-OF-KINGDOM STUDY

Both the College Preparatory Program and the Industrial Training Center program include 180 classroom hours of instruction designed to provide the student with certain skills and information which will prepare him for study abroad. These classroom hours consist of:

	Hours
Study Skills	40
TOEFL Preparation	35
Typing	60
Introduction to Computer Programming	30
Out-of-Kingdom Orientation	15
TOTAL:	**180**

All potential College Degree Program (CDP) candidates have received this training as part of their preparation for Out-of-Kingdom study. Students in the Industrial Training Centers complete this course work in Level 7. The CPP students complete courses in Phases 3 through 6.



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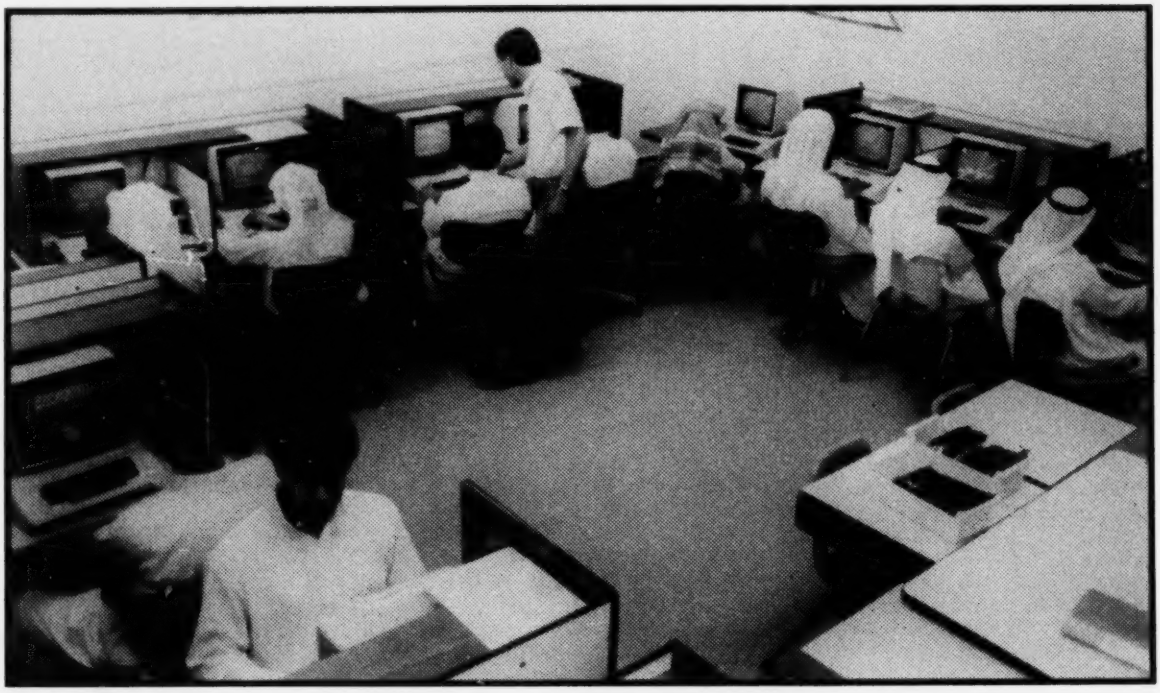
Study Skills

Much of the teaching-learning process in ARAMCO is focused on teacher-student exchanges, using the question/answer format. There is little lecture-type instruction. Dictionary and library usage, note taking, outlining, organization skills, and research-paper and report writing are covered during the 40 hours of study skills instruction.



Introduction to Computer Programming

This 30-hour course is offered at Level 7 of the ITCs and Phase 6 of the CPP. Its purpose is to provide students with an introduction to BASIC, the language which is used on the Apple microcomputer. The course covers the beginning chapters of *Introduction to AppleSoft BASIC,* published by the Minnesota Educational Computing Consortium (MECC).

TOEFL Preparation

During the 35 class hours of this module, students receive instruction in test-taking skills and they take a sample TOEFL.

Typing

The goal of this training is for students to become familiar with the keyboard and to achieve a minimum speed of 15 words per minute with 80% accuracy. This goal seems reasonable for a student for whom English is a foreign language.

Out-of-Kingdom Orientation

For students who have been selected to attend an institution Out-of-Kingdom (usually in the United States), this 15-hour program describes U.S. higher education and stresses topics that will

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enable students to function effectively in a new cultural setting. Housing, money, food, homesickness, and climatic, social, and cultural differences are covered. A six-part U.S. Information Agency (USIA) film series is shown to illustrate the nature of U.S. higher education in general. Specific institutional experiences are also discussed. Students who have completed an OOK degree share their experiences about study in the United States.

In addition to the 180 hours of preparation for study abroad provided at the ITCs and the CPP, each student attends a Saudi Government orientation program as well as orientation at the ARAMCO Services Company office in Houston, Texas.

Kingdom of Saudi Arabia Orientation

Each Out-of-Kingdom candidate is given a three-week special orientation required by the Saudi Government that is based primarily on the religious and cultural heritage of Islam.

ARAMCO Services Company Orientation – Houston

All ARAMCO students, once admitted to a college or university, are brought to ARAMCO offices in Houston for three days of orientation prior to departure for their respective campuses. Each student is assigned to an advisor who will oversee his academic life while in the United States. Plans are made for the program of study, which is entered into an elaborate computer tracking system enabling ARAMCO to project when each student will complete his degree and return to regular employment. A complete review of previous orientation topics also occurs in Houston. ARAMCO advisors in Houston work hard to establish a relationship with each trainee through individual sessions. This creates the basis for campus visits by the advisor once each semester. All of this support is aimed at assisting the student in his transition to study in the United States and at providing information and skills which will increase the probability of academic success. Support services for ARAMCO students are described in further detail at the end of this report.

ADMISSIONS CONSIDERATIONS

Any comments in this report concerning eligibility for admission to U.S. colleges and universities are based upon the knowledge and experience of NAFSA consultation team members. Our review of the ARAMCO training program for college preparation and of ARAMCO student performance in U.S. colleges and universities enables us to make the following general observations and suggested guidelines for U.S. foreign student admissions officers. If more detailed questions should occur in the evaluation process, the NAFSA consultation team members are available for consultation by telephone or through correspondence. The Academic Training Division staff of the ARAMCO Services Company in Houston, Texas, is also an excellent resource.

American admissions officers are required by their institutions and the U.S. Immigration and Naturalization Service (INS) to clear a foreign student in three distinct categories—academic, linquistic, and financial—before offering admission to that student. Those categories, therefore, provide the framework for reviewing ARAMCO trainee applications.

Academic: Admissions Officers will receive applications from students through the ARAMCO Services Company in Houston. Some will have an ITC academic record, others a high school diploma and an ITC academic record, and still others a high school diploma and CPP academic record. In order to understand the academic background of most applicants, the admissions officer will need to know about the Saudi Government secondary school program.*

ARAMCO is sending its very best students abroad. They come from the top 10% of those who begin training. The ARAMCO courses which the student has completed and the hours spent studying each subject are clearly outlined on the ITC and CPP transcripts and discussed elsewhere in this report.

A Saudi secondary school graduate with General Secondary Certificate results of less than 80% can be admitted to an Industrial Training Center (ITC). A Saudi ARAMCO employee who has not completed secondary school can also be admitted if he is recommended by ARAMCO's Saudi Career Development Department or by his department head. Even though some ITC students may not be Saudi Government secondary school graduates, they will complete the same ARAMCO program (through Level 7) as Saudi Government secondary school graduates. This training includes mathematics, through integrated algebra and trigonometry, and science, including chemistry and physics. ITC students must obtain an overall average of 86%** in order to qualify for ARAMCO sponsorship of their college or university studies.

A Saudi secondary school graduate with General Secondary Certificate results of 80% or better can be admitted to the College Preparatory Program (CPP). To be eligible for out-of-Kingdom placement, CPP students must have completed all courses through Phase 6 with an overall average of 70%.

CPP Phases 7 and 8 are for students who have completed CPP Phase 6 or ITC Level 7. These students are given enrichment in English, mathematics, and science while waiting for the paperwork to be completed for placement in the United States.

It should be noted that ITC and CPP students have received instruction in general education courses, which include geography and accounting as well as typing and training in computer skills.

> **NOTE:** It is the opinion of the NAFSA consultation team that students who have completed the CPP and the ITC programs, including those who did not graduate from a Saudi Government secondary school, have received academic training in mathematics and science comparable to that received by American students entering such U.S. programs as engineering and computer science.

*See *The Admission and Academic Placement of Students from Selected Arab Countries.* AACRAO/NAFSA Joint Committee on Workshops, Washington, D.C., 1976.

**ITC and the CPP Grading Scale:
94-100=A; 86-93=B; 78-85=C; 70-77=D; 0-69=F

English Language Proficiency: Less emphasis is placed on reading and writing than normally occurs in American ESL programs (see section on ARAMCO English language training programs). No ARAMCO trainee is considered eligible for placement in a U.S. institution without having first scored at least 500 on an international TOEFL. ARAMCO has established the 500 TOEFL minimum for Out-of-Kingdom study in order to improve students' probability of academic success. ARAMCO studies indicate that students with less than 500 on the TOEFL experienced the highest rate of attrition.

Financial Clearance: All ARAMCO trainees are fully funded for their educational expenses, which include tuition and fees, room and board, books, travel, and tutoring if necessary. Students also receive two thirds of their regular pay as ARAMCO employees.

ACADEMIC SUPPORT SERVICES

The Saudi Career Development Department of the ARAMCO Services Company (ASC) in Houston provides a wide range of academic support services which complement the ARAMCO training operations in Saudi Arabia. When students complete the College Preparatory Program (CPP) in Dhahran, the Saudi Career Development Department in Houston, in cooperation with the sponsoring ARAMCO department, places them in U.S. colleges and universities.

There are 20 *academic counselors* who make campus visits each semester to check on student academic progress and adjustment to campus life. On-campus meetings include the foreign student advisor, foreign student admissions officer, and faculty members.

A highly sophisticated, computerized *tracking system* is used to monitor the academic progress of all ARAMCO—sponsored students. This data is also used to predict the potential success of individual students.

Strict *quality control* is assured not only through the rigorous selection process (reflected by the ITC and the CPP requirement of an overall average of 86%*), but also through strict academic performance standards. Each trainee must maintain a 2.5 cumulative grade point average in order to remain in the United States. Students are required to register for 12 semester hours during the first term of the freshman year, and for a minimum of 15 semester hours thereafter. Both the GPA and semester hour requirements are monitored by the computerized tracking system.

The ARAMCO Services Company also places ARAMCO employees in *specialized post-graduate courses* (e.g., geology, physics, engineering and medicine) requested by the sponsoring ARAMCO department.

*ARAMCO statistical studies indicate that only about 10% of ITC trainees successfully complete all Level 7 courses, including mathematics, science, English, and general education courses, with an overall average of 86%.

EDITOR'S NOTE

As indicated in the introduction to this report, the NAFSA consultation team presented an oral report to the ARAMCO administration in Dhahran. That report included several recommendations for strengthening the academic preparation of ITC and CPP students.

The rapid adjustment of curricula to meet changing needs has been mentioned. In the short time between the team's return to the United States and the publication of this report, many of the recommendations presented in Dhahran have been adopted and will be implemented with the class entering in July 1985. Those recommendations which the team considered long-range are to be implemented in January 1986.

Such prompt action provides further evidence of ARAMCO's commitment to provide the best possible academic preparation for its employees who have been selected for further study, either in kingdom or out of kingdom.

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